

### ABSTRACT OF THE DISCLOSURE

An apparatus and method employing principles of stereo vision for determining one or more orientation parameters and especially the second and third Euler angles  $\theta$ ,  $\psi$  of an  
5 elongate object whose tip is contacting a surface at a contact point. The apparatus has a projector mounted on the elongate object for illuminating the surface with a probe radiation in a known pattern from a first point of view and a detector mounted on the elongate object for detecting a  
10 scattered portion of the probe radiation returning from the surface to the elongate object from a second point of view. The orientation parameters are determined from a difference between the projected and detected probe radiation such as the difference between the shape of the feature produced by  
15 the projected probe radiation and the shape of the feature detected by the detector. The pattern of probe radiation is chosen to provide information for determination of the one or more orientation parameters and can include asymmetric patterns such as lines, ellipses, rectangles, polygons or the  
20 symmetric cases including circles, squares and regular polygons. To produce the patterns the projector can use a scanning arrangement or a structured light optic such as a holographic, diffractive, refractive or reflective element and any combinations thereof. The apparatus is suitable for  
25 determining the orientation of a jotting implement such as a pen, pencil or stylus.